

**2005 IAP**

# **Lake City Army Ammunition Plant**

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**Installation Action Plan**



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**2005 IAP**

# **Lake City Army Ammunition Plant**

**Missouri**

# Statement of Purpose

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The purpose of the Installation Action Plan (IAP) is to outline the total multi-year restoration program for an installation. The plan will define Installation Restoration Program (IRP) requirements and propose a comprehensive approach and associated costs to conduct future investigations and remedial actions at each Solid Waste Management Unit (SWMU) at the installation and other areas of concern.

In an effort to coordinate planning information between the IRP manager, major army commands (MACOMs), installations, executing agencies, regulatory agencies, and the public, an IAP has been completed for the Lake City Army Ammunition Plant (LCAAP). The IAP is used to track requirements, schedules and tentative budgets for all major Army installation restoration programs.

All site specific funding and schedule information has been prepared according to projected overall Army funding levels and is therefore subject to change during the document's annual review. Under current project funding, all remedies will be in place at the LCAAP by the end of 2007.

The following agencies contributed to the formulation and completion of this 2005 Installation Action Plan for Lake City Army Ammunition Plant during a planning workshop held on 18 May 2004:

**ARCADIS**

**ATK**

**CENWK-PM-E**

**EEI for USAEC**

**Lake City AAP**

**MDNR**

**The Flatwater Group**

**U.S. Army Environmental Center**

**U.S. Environmental Protection Agency**

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# Acronyms & Abbreviations

ABLF	Abandoned Landfill
ACSIM	Assistant Chief of Staff for Installation Management
AEDB-R	Army Environmental Database Restoration
AFSC	Army Field Support Command
AOC	Areas of Concern
AOI	Area Of Interest
ATK	Alliant Tech Systems
BLRA	Baseline Risk Assessment
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act of 1980
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
CGMP	Comprehensive Groundwater Monitoring Program
COC	Contaminant of Concern
COE	Corps of Engineers
COPC	Contaminant of Potential Concern
DA	Department of the Army
DOE	Department of Energy
DPG	Defense Planning Goals
DU	Depleted Uranium
EE/CA	Engineering Evaluation/Cost Analysis
EFF	Effluent
EP Toxicity	Extraction Procedure Toxicity Test
EPA	United States Environmental Protection Agency
ER,A	Environmental Restoration, Army
ESD	Explanation of Significant Differences
FFA	Federal Facility Agreement
FS	Feasibility Study
FY	Fiscal Year
GFPR	Guaranteed Fixed Price Remediation
GOCO	Government Owned, Contractor Operated
GW	Groundwater
GWM	Groundwater Monitoring
HRS	Hazard Ranking Score
IAG	Interagency Agreement
IAP	Installation Action Plan
IRA	Interim Remedial Action
IROD	Interim Record of Decision
IRP	Installation Restoration Program
IWOU	Installation Wide Operable Unit
IWTP	Industrial Wastewater Treatment Plant
JMC	Joint Munitions Command
K046	RCRA Hazardous Waste Code for wastewater treatment sludges from the manufacturing, formulation and loading of lead-based initiating compounds (CFR 261.32)
LCAAP	Lake City Army Ammunition Plant
LTM	Long Term Monitoring
LTO	Long Term Operation
MACOM	Major Command
MDNR	Missouri Department of Natural Resources

MIP/CPT	Membrane Interface Probe/Cone Penetrometer Technique
MPVE	Multi-phase Vapor Extraction
NAPL	Non-aqueous Phase Liquid
NE	Not Evaluated
NECOU	Northeast Corner Operable Unit
NFA	No Further Action
NPL	National Priority List
NRC	Nuclear Regulatory Commission
OSC	Operations Support Command
OU	Operable Unit
P & T	Pump and Treat
PA	Preliminary Assessment
PAH	Polycyclic Aromatic Hydrocarbons
PBC	Performance-Based Contract
PCB	Polychlorinated Biphenyls
PETN	Pentaerythritol tetranitrate
PP	Proposed Plan
PRB	Permeable Reactive Barrier
PRG	Preliminary remediation Goals
PRW	Permeable Reaction Wall
RA	Remedial Action
RA(C)	Remedial Action - Construction
RA(O)	Remedial Action - Operation
RAB	Restoration Advisory Board
RC	Response Complete
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RDX	Cyclotrimethylenetrinitramine
RI	Remedial Investigation
ROD	Record of Decision
RRSE	Relative Risk Site Evaluation
S&A	Supervision and Administration
SARA	Superfund Amendments and Reauthorization Act
SCAPS	Site Characterization Analysis and Penetrometer System
SI	Site Inspection
SVOCs	Semi Volatile Organic Compounds
SWMU	Solid Waste Management Unit
TNR	Trinitroresourcinal
USACE	United States Army Corps of Engineers
USACHPPM	United States Army Center for Health Promotion and Preventive Medicine
USAEC	United States Army Environmental Center
USAEHA	United States Army Environmental Hygiene Agency (currently called USACHPPM)
USATHAMA	United States Army Toxic and Hazardous Material Agency (currently called USAEC)
USEPA	United States Environmental Protection Agency
VOCs	Volatile Organic Compounds
WP	Work Plan

<b>STATUS:</b>	NPL Installation, HRS of 33.62		
<b>TOTAL # OF AEDB-R SITES:</b>	35		
<b>ACTIVE ER,A SITES (PBC):</b>	32		
<b>ACTIVE ER,A SITES (Non-PBC):</b>	3 (Sumps, [35], Area 10, Area 27)		
<b>DIFFERENT SITE TYPES:</b>	1 Burn Area	4 Contaminated Fill	
	5 Surface Disposal area	3 Drainage Ditch	
	4 Disposal Pit/ Dry Well	1 Firing Range	
	1 Industrial Discharge	6 Landfill	
	1 Storage Area	7 Surface Impoundment/Lagoon	
	1 Spill Site Area	1 Waste Treatment Plant	
<b>CONTAMINANTS OF CONCERN:</b>	Explosives, Organic Chemicals, Metals, PCBs		
<b>MEDIA OF CONCERN:</b>	Groundwater, Soil, Surface Water, Sediments		
<b>COMPLETED REM/IRA/RA:</b>	<ul style="list-style-type: none"><li>• IRA: Area 18 Pump and Treat (1996)</li><li>• IRA: Area 17 Permeable Reactive Wall, Cost (2001)</li></ul> <i>(For a full list of past REM/IRA/RAs, see the REM/IRA/RAs Section)</i>		
<b>RA FIVE YEAR REVIEW:</b>	2005, 2012, 2017, 2022, 2027, 2032		
<b>CURRENT IRP PHASES (Non-PBC):</b>	IRA at 4 sites	RA(C) at 2 sites	
<b>PROJECTED IRP PHASES (Non-PBC):</b>	IRA at 2 sites	RA(C) at 2 sites	RA(O) at 1 site
<b>IDENTIFIED POSSIBLE REM/IRA/RA:</b>	Area 18: Enhanced Bioremediation, Source Removal, Pump and Treat NECOU: Enhanced Bioremediation, Source Control, Soil Removal and capping IWOU: Soil Removal, Capping, Pump and Treat		
<b>DURATION:</b>	Year of IRP Inception: <b>1979</b> Year of IRP Completion excluding LTM: <b>2007</b> Year of IRP Completion including LTM: <b>2034</b>		

# Installation Information

## ***SITE DESCRIPTION:***

LCAAP is located in Independence, (population 100,000) Missouri (in Jackson County). It is located 23 miles east of Kansas City, Missouri (population 500,000), 3 miles north of Blue Springs (population 42,000), 2 miles southwest of Buckner (population 3,040) and adjacent to Lake City (population 50). Installation is 3,935 acres in area.

## ***COMMAND ORGANIZATION:***

ACSIM (Assistant Chief of Staff for Installation Management)  
**INSTALLATION:** Lake City Army Ammunition Plant

## ***IRP EXECUTING AGENCIES:***

Installation and U.S. Army Corps of Engineers, Kansas City District.

## ***REGULATORY PARTICIPATION:***

**FEDERAL:** U.S. Environmental Protection Agency (EPA), Region VII, Superfund Branch.  
**STATE:** Missouri Department of Natural Resources (MDNR), Division of Environmental Quality.

## ***REGULATORY STATUS:***

NPL Installation with an IAG.

## ***MAJOR CHANGES TO IAP FROM PREVIOUS YEAR (2004):***

- Performance Based Contract (PBC), Guaranteed Fixed Price Remediation, awarded September 2003 to ARCADIS. The contract requires remedies in place for all operable units by the end of FY07. PBC milestones have been established and include removal actions for some sites. Work outside the PBC scope includes sumps and Area 10 Sandpile (DU and metals contamination). LCAAP will prepare EE/CA for these items for removal actions.
- Area 16 Interim Removal Action was modified to include engineered wetlands for treatment of leachate collected at the ABLF (abandoned landfill).
- To support the removal action for the Area 10 sandpile, additional field sampling was performed. These costs, along with costs for preparation of decision documents will be born by Army Field Support Command (AFSC). Actual removal costs will be equally shared by ER,A and AFSC.
- AFSC completed human health risk assessment for the operating range (Area 27). This was performed to confirm earlier assessment due to quality issues. No further action is planned on this Area until range closure.



# Installation Information

## ***MISSION STATEMENT:***

The LCAAP Installation Restoration Program mission is to achieve DPG Goals in a responsible and efficient manner with stakeholder involvement and satisfaction.

## ***HISTORY:***

Lake City Army Ammunition Plant (LCAAP) is an active U.S. Army Joint Munition Command, which manufactures small caliber ammunition, including 5.56mm, 7.62mm, and .50 caliber rounds. It is a Government-owned contractor-operated (GOCO) facility that is operated by Alliant TechSystems (ATK).

LCAAP was the first new Government-owned facility established in the early 1940s to expand small caliber ammunition production in the United States. Construction at this 3,935-acre facility was initiated on 26 Dec 40 and completed on 11 Oct 41. The plant has operated continuously since 1941, except for a five-year period between World War II, and the Korean Conflict. The operating contractor from 1941 to 1985 was Remington Arms. In November 1985, plant operations were assumed by Olin Corporation. ATK became the operator in 2000.

LCAAP has produced a variety of small arms ammunition since 1941, including .30 caliber, .38 caliber, .50 caliber, 5.56mm, 7.62mm, 20mm, and 30mm ammunition. During WWII, 5.7 billion cartridges were produced; during the Korean Conflict, 1.1 billion, and during the Vietnam conflict, 14.4 billion. In 1996, production was about 379 million cartridges. Production has dramatically increased over the past two years, now approaching 1.2 billion rounds per year.

# Contamination Assessment

## OVERVIEW

LCAAP is an NPL site and is jointly regulated by the U.S. EPA Region VII and MDNR. A SARA 120 Interagency Agreement (IAG) was signed by DA, EPA and MDNR and went into effect on 28 Nov 89. LCAAP is divided into three operable units: Area 18, Northeast Corner (NECOU), and Installation-Wide (I-W)

An installation assessment of LCAAP was conducted by the U.S. Army Toxic and Hazardous Materials Agency (USATHAMA) in 1979 to assess the environmental quality of the facility. This report recommended that the installation should monitor the groundwater beneath the sandpits in the northwest corner of the installation.

In 1985, USATHAMA initiated a preliminary assessment/site investigation (PA/SI) program at LCAAP. Several areas of possible contamination were identified and a sampling plan was implemented. The PA/SI involved the installation of 24 groundwater monitoring wells at seven sites, and the analysis of 48 soil and water samples. All seven areas sampled detected contaminants in the groundwater, including volatile chemicals, semi-volatiles, explosives and metals.

A Three Phase Remedial Investigation (RI) was initiated in August 1987. The first phase of fieldwork was completed in August 1988, the second phase in September 1990, and the third phase in December 1992. A total of 35 AEDB-R Sites have been identified for LCAAP.

The results of the fieldwork showed low-level groundwater contamination in several areas across LCAAP. Constituents included volatile organic chemicals, metals and explosives. The Area 18 operable unit (LCAAP-018) has several old burn pits/trenches contaminated with organics and metals, as well as a groundwater contamination plume. The Northeast Corner operable Unit (LCAAP-011,-016,-017) contains heavily contaminated oil and solvents pits; a 8.5-acre abandoned landfill with contaminated leachate seeps; a waste glass, paints and solvents area; and a (RCRA closed) metals-and explosives-contaminated burning ground. The Installation-Wide Operable Unit (remaining 31 AEDB-R sites) has a number of areas with surface and subsurface contamination, primarily metals.

Water from several of the plant's production/potable wells contains volatile organics in excess of drinking water standards. Air strippers to treat this problem were installed for three wells in January 1990 and for four additional wells in 1992.

Approximately eight off-post residential potable water wells north of Lake City were included in a quarterly monitoring program that was in operation from 1987 until October of 1993. Low-level explosive and volatile organic contamination has been sporadically detected in the residential wells, but levels remained below applicable criteria until recently. One sample containing TCE in December 1992, three samples containing cadmium in March 1993, and two samples containing lead in September 1993, were above Safe Drinking Water Standards. Eight off-post private wells were sampled in November 2002 and while low levels of metals were reported, no VOCs or explosives were detected in the private wells sampled.

In the Fall of 1992, eight off-post groundwater monitoring wells were installed in strategic locations to intercept any contaminants that may migrate from LCAAP. The Comprehensive Groundwater Monitoring Program (GMP), which began in June 1994, continues to monitor CERCLA perimeter wells on a biannual basis. Surface water locations and water supply wells are also sampled biannually as part of the GMP. In a letter from MDNR in April 2003, RCRA Subtitle C biannual monitoring was deferred to the CERCLA RI/FS program and RCRA Subtitle D monitoring was discontinued.

In 1996, Groundwater contaminated primarily with trichloroethylene and 1,2-dichloroethane was discovered at the northern LCAAP perimeter in Area 16. Off-post screening investigations on the Summers Property have been completed. Results indicated that contaminants have migrated off-post. Monitoring wells are required to validate the screening results. Although a time critical removal action (EW-2) was conducted to contain the contaminants, the Army is planning to conduct further investigation to verify the capture zone of the pump and treat well system, and determine if the COCs are retracting or represent the leading edge of the migration.

# Contamination Assessment

## OVERVIEW, continued

The Area 18 pump and treat system (which began as a Removal Action) began operations in March 1997. The system became the object of a ROD in April of 1999, and continues to operate as part of the Final Remedy for the Area 18 Operable Unit. A multi-phase vapor extraction (MPVE) system and remediation of lead contaminated soil were also identified in the ROD. Data collected in support of the MPVE system design indicated that the plume extent was greater than originally defined. A design investigation was conducted which identified VOC plumes originating from AOCs 1 through 3 extending into the Lake City Aquifer. The design of the MPVE system was discontinued for further site characterization. A field investigation has yielded data that identifies the plume to be in excess of 10X the original size, and has identified other COCs in surface and near-surface soils (PCBs and PAHs). In 2003, the Army installed 28 additional monitoring wells and conducted two quarterly sample events to confirm the extent of VOC contamination.

The removal contract to excavate and dispose of lead contaminated soils was terminated due to the discovery of PCBs in surface and near surface soils adjacent to the source areas. The PBC contractor has proposed a Work Plan to complete the characterization of this operable unit.

An Interim Remedial Action ROD was signed in September 1998 for installation of a permeable reactive barrier to treat groundwater from NECOU. The permeable reactive barrier (PRB) was installed between July 2000 and January 2001. Starting in March 2001 monitoring of the PRB was conducted on a quarterly basis to track the performance and effectiveness of the barrier. In December 2002 a hydrologic assessment of the PRB was conducted to evaluate the hydraulic conductivity and groundwater flow through and in the vicinity of the PRB. The assessment identified that groundwater was flowing around the PRB, but could not define whether contamination from the plume was redirected with the groundwater flow. In 2003, the Army conducted a plume delineation investigation to define the path of the plume post construction of the PRB.

Also as part of the Interim Remedial Action ROD for the NECOU, a soil cover was placed on the Oil and Solvent Pits (Area 17B). An Interim Removal Action for the repair of cover material and collection of leachate for the Abandoned Landfill (ABLF) is underway. In late 2003 an Explanation of Significant Difference (ESD) to the removal action was made available for public review and comment. The changes made proposed use of an engineered wetland for treatment of collected leachate rather than pumping to Building 163 for treatment. The change was predicated on the chemical analysis of the leachate. Cracks in the ABLF cover were repaired and two feet of compacted clay placed over the waste material. An additional one foot of vegetative cover soil was then placed followed by seeding. Collected leachate is stored in tanks prior to construction of the wetland. Flow and chemical concentration data are being collected for input to the wetland design.

Additional monitoring wells were installed in the NECOU to better define groundwater quality, especially undefined source areas and bedrock contamination. These and existing wells were sampled in 2003.

The Installation-Wide Operable Unit (IWOU) is early in the Remedial Investigation phase. Characterization sampling of the Area 10 Sand Pile was completed. This data will be used to prepare an EE/CA for a removal action planned in FY2005. Sampling was also completed for Area 27 for the purposes of confirming the public health risk assessment prepared in the mid-1990s. Questions on the quality of the data used to prepare the earlier document required this reassessment. This work was funded by the Army Field Support Command.

In September 2003 the Army awarded a Performance Based Contract (PBC), Guaranteed Fixed Price Remediation (GFPR), to ARCADIS. The contract requires ARCADIS to have remedies in place prior to October 2007. ARCADIS has responsibility for all Areas except for sumps in the production area and the Area 10 Sand Pile. These two exceptions will remain the Army's responsibility and will be the subject of removal actions. ARCADIS has presented field Work Plans for all operable units and has updated the groundwater model for LCAAP.

# Contamination Assessment

## PREVIOUS STUDIES

Title	Author	Date
Installation Assessment of Lake City Army Ammunition Plant	USATHAMA	May-80
Lake City Army Ammunition Plant Preliminary Assessment/Site Inspection	USATHAMA	Jan-89
Final Phase I Remedial Investigation Report for Lake City Army Ammunition Plant, Volumes I-2	USATHAMA	Jun-90
Installation Restoration Program Conceptual Program for Lake City Army-Ammunition Plant	USATHAMA	Dec-90
Assessment of Applicable or Relevant and Appropriate Requirements, (ARARS) for LCAAP	USATHAMA	Dec-90
Data Deliverables for the Northeast Corner Operable Unit Lake City Army Ammunition Plant	USATHAMA	Mar-91
Data Deliverables for the Phase II Remedial Investigations Lake City Army Ammunition Plant	USATHAMA	Mar-91
Final Phase I Remedial Investigation Report on Lake City Army Ammunition Plant, Volume III	USATHAMA	May-91
Draft Final Remedial Investigation Report of the Area 18 Operable Unit at Lake City Army Ammunition Plant, Volume 1: Text, Volume 2.- Appendices	USAEC	Aug-93
Draft Final Remedial investigation Report of the Northeast Corner Operable Unit at Lake City Army Ammunition Plant, Volume 1: Text, Volume 2: Appendices	USAEC	Oct-93
Draft Remedial Investigation Report of the Installation-Wide Operable Unit at Lake City Army Ammunition Plant, Volume 1, Part I: Text, Part II: Figures and Tables, Volume 2: Appendices	USAEC	Oct-93
Draft Feasibility Study Workplan of the Installation-Wide Operable Unit at Lake City AAP	USAEC	Nov-93
Draft Feasibility-Study Report of the Area 18 Operable Unit at Lake City AAP	USAEC	Dec-93
Draft Remedial Investigation Report of Area 8 Operable unit at Lake City AAP, Volume I Text, Volume 2: Appendices	USAEC	Dec-93
Draft-Final Remedial Investigation Report of the Installation-Wide Operable Unit at Lake City AAP, Volume 1, Part I: Text,-Part 11: Figures and Tables, Volume 2: Appendices	USAEC	Feb-94
Draft Remedial Investigation Report of the Area 18 Operable Unit at Lake City Army Ammunition Plant, Volume 1: Text, Volume 2: Appendices	USAEC	Oct-94
Draft Remedial Investigation Report of the Northeast Corner Operable Unit at Lake City Army Ammunition Plant, Volume 1: Text, Volume 2: Appendices	USAEC	Nov-94
Final Engineering Evaluation/Cost-Analysis Report for a Non-Time-Critical Removal Action for the Area 18 Operable Unit at Lake City Army Ammunition Plant	USAEC	Nov-94
Final Remedial Investigation Report of the Area 18 Operable Unit at Lake City Army Ammunition Plant, Volume 1: Text, Volume 2, Appendices	USAEC	Jan-95
Final Remedial Investigation Report of the Northeast Corner Operable Unit at Lake City Army Ammunition Plant, Volume 1: Text, Volume2: Appendices	USAEC	Mar-95
Draft Action Memorandum-for the Non-Time-Critical Removal Action for the Area 18 Operable Unit Lake City Army Ammunition Plant (LCAAP), Independence, Missouri.	LCAAP	Apr-95
Draft Feasibility Study Report of the Area 18 Operable Unit at LCAAP, Independence, Missouri	LCAAP	May-95
Final Action Memorandum for the Non-Time-Critical Removal Action for the Area 18 OU	LCAAP	Jun-95
Final Feasibility Study Report of the Area 18 Operable Unit at LCAAP	LCAAP	Sep-95
Draft Final Feasibility Study Report of the Northeast Corner Operable Unit at LCAAP	LCAAP	Jun-96
Draft Final Proposed Plan for the Area 18 Operable Unit, Independence, Missouri. Supplemental Assessment of Groundwater Contamination in the NECOU, Independence, Missouri.	LCAAP	Nov-96

*Previous Studies continued next page*

# Contamination Assessment

## PREVIOUS STUDIES, continued

Title	Author	Date
Engineering Evaluation/Cost Analysis, Non-Time-Critical Removal Action for the Area 16 Abandoned Landfill at the Northeast Corner Operable Unit, Independence, Missouri.	LCAAP	Jan-97
Landfarming Treatability Pilot Study Report, Independence, Missouri.	LCAAP	Mar-97
Draft Final Proposed Plan for the Area 18 Operable Unit, Independence, Missouri.	LCAAP	Apr-97
Action Memorandum, Lake City Army Ammunition Plant, Non-Time-Critical Removal Action for the Northeast Corner Operable Unit Area 16 Abandoned Landfill, Independence, Missouri.	LCAAP	Jun-97
Village of Lake City Residential Well Evaluation, Independence, Missouri.	LCAAP	Jun-97
Final Record of Decision for an Early Remedial Action at the Northeast Corner Operable Unit	LCAAP	Sep-98
Draft Final Construction Summary Report, Northeast Corner Operable Unit, Lake City Army Ammunition Report, Independence, Missouri	LCAAP	Nov-02
Final Summary Report, Summers Property Groundwater Investigation, Lake City Ammunition Report, Independence, Missouri	LCAAP	Dec-02
Draft Final Area 27 Human Health Risk Assessment, Lake City Army Ammunition Plant	US Army Field Support	Apr-04

**2005 IAP**

**Lake City  
Army Ammunition Plant  
ER,A Site Descriptions**

# NORTHEAST CORNER OPERABLE UNIT

## OU DESCRIPTION

The Northeast Corner Operable Unit is approximately 190 acres in size and is located in the northeast portion of the Installation. The majority of the NECOU source areas are situated in an upland area composed of clay and claystone. However, the western boundary of the OU is situated on an area of transition between the uplands and a lower-lying area under which the Lake City Aquifer is found. Within the NECOU, the Lake City Aquifer is located northwest of Buckner Road. This aquifer is an old stream channel beneath the ground surface consisting primarily of sand and gravel. The sand and gravel that make up this aquifer carry significant quantities of potable ground water.

The Northeast Corner Operable Unit (NECOU) comprises three of the 35 IRP Areas at LCAAP: Area 11 Burning Grounds (LCAAP-011), Area 16 Abandoned Landfill (LCAAP-016), and Area 17 Sanitary Landfill/Oil and Solvents Pits (LCAAP-017). There are 10 solid waste management units (SWMUs) within the three areas that have been used for a variety of waste disposal activities including landfilling of solid waste, industrial sludge, spent solvents, paints and oils and for open burning of explosives and other wastes. The SWMUs within the NECOU are identified as follows:

1. Area 11 - Burning Grounds (Closed RCRA site)
2. Area 16A - Abandoned Landfill (inactive)
3. Area 16B - Solvent Pits (inactive)
4. Area 16C - Firing Range (inactive)
5. Area 16D - Burning Grounds (inactive)
6. Area 17A - Current Landfill (permitted sanitary landfill but not currently being used)
7. Area 17B - Oil and Solvents Pits (inactive)
8. Area 17C - Burning Pad (inactive)
9. Area 17D - Waste, Glass, Paint, and Solvents Area (inactive)
10. Area 17E - Current Pistol Range (used for security force weapons training)

The Area 11 Burning Grounds was an area used for open burning of explosive compounds and pyrotechnics and has been closed under RCRA (for soil only). Area 16 includes the 8.7 acre Abandoned Landfill, solvent disposal pits, an inactive firing range, and burning grounds. Area 17 includes the Sanitary Landfill; three large oil and solvent disposal pits; a former burning pad; waste, glass, paint, and solvents disposal pits; and an active pistol range.

In addition to the 10 SWMUs, there are two RCRA areas and two other areas that are being addressed as part of the NECOU FS. The RCRA areas, the Paint and Waste Solvent Storage Facility in the Waste, Glass, Paint, and Solvents Area and the former Solvent and Oil Waste Tanks near the Abandoned Landfill have been incorporated into the overall CERCLA program at LCAAP via the FFA. The other two are referred to as the East Gate Plume and West ABLF Plume. Initially, the source of these plumes was unknown. Recent field investigations have tied the East Gate Plume to 17B Oil and Solvents Pits and the West ABLF Plume to the 16B Solvents Pits.

## PROPOSED PLAN

- Continued operation of the extraction well 17-S with treatment at Building 163.
- Evaluate bedrock contamination and collect data for remaining data gaps.
- Construct engineered wetland for leachate collected from the ABLF.
- Conduct pilot tests using enhanced bioremediation.
- Complete Feasibility Study.
- Groundwater Monitoring.
- ROD
- RD.
- RA(C)



### OU DESCRIPTION

Area 18 is located in the north-northeast portion of the installation and covers 167 acres. Eight surface impoundments existed in this area in the 1950s, in which Industrial Wastewater Treatment Plant (IWTP) waste grease and oil, solvents, and trash were burned. Fifteen additional pits used for burning and disposal of IWTP and other wastes were located throughout the area. A VOC plume lies in the groundwater beneath Area 18. A removal action (REM) to install a pump and treat system for the groundwater has been completed, and was expanded to include treatment of VOC-containing groundwater from the newly-constructed groundwater extraction well in Area 16.

Pre-design activities were started for a Multi-Phase Vacuum Extraction system to address organic contaminants in soil and in shallow groundwater. Data collected in support of the design activities discovered that the vertical and areal extent of the VOC contamination was greater than originally anticipated. A design investigation consisting of MIP/CPT data at 53 locations and discrete groundwater samples at 10 locations provided data that indicated that the proposed MPVE system may not be a viable option. A work plan was prepared to conduct a field investigation to characterize the nature and extent of contamination originating from the Oil and Solvent Pits and evaluate potential remedial options. The field investigation was initiated on April 15, 2002. Preliminary data indicates that the areal extent of the VOC plume is an order of magnitude larger than original anticipated. Data collected during this investigation will be presented in a Remedial Investigation/Feasibility Study (RI/FS) Addendum Report.

### PROPOSED PLAN

- Continued operation of GW pump and treat system (funded under LCAAP-018).
- Characterize the nature and extent of VOC contamination originating from the identified pits in Area 18.
- Determine the presence and define the extent of additional COCs.
- Evaluate potential remedial options.
- Conduct one or more pilot tests, including enhanced bioremediation.
- A RI/FS Addendum will be prepared following the investigation and pilot studies.
- Long-term Groundwater Monitoring.
- ROD Amendment.
- RD.
- RA(C).



# INSTALLATION WIDE OPERABLE UNIT (IWOU)

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## OU DESCRIPTION

The Installation-wide Operable Unit consists of the remaining 31 sites. Semi-annual groundwater monitoring is currently being conducted at the fence perimeter, off-site, and at selected on-post wells including water supply wells. The Army will update existing groundwater modeling to provide recommendations for the operation of the post's production Water Supply System and groundwater containment program.

Soils and groundwater are contaminated with metals, explosives, VOCs, and SVOCs. The Area 10 Sand Pile is contaminated with metals, depleted uranium (DU) and other ordnance-related contaminants.

## PROPOSED PLAN

The Army will initiate a comprehensive RI and BLRA (which includes a Human Health Risk Assessment and Ecological Risk Assessment) for the IWOU. The Risk Assessment will facilitate development of remedial objectives consistent with Army policies regarding future land-use.

A removal action is planned to characterize, treat, and dispose Area 10 DU and lead contaminated soils (also referred to as the Sand Pile). This removal action will be conducted independently of the RI/FS for IWOU, however other AOIs in Area 10 outside of the Sand Pile will be addressed in the RI/FS. An EE/CA is being completed to facilitate the development of an Action Memorandum for the Area 10 Sand Pile. Army Field Support Command (AFSC) is managing this IRA.

### *In summary:*

- Completion of RI/FS Work Plan for assessment for all media in all IWOU sites (with the exception of the Area 10 Sand Pile Removal Action and the Active Range in Area 27).
- Complete field data collection and site characterization for the IWOU.
- Prepare a RI/FS and BLRA for the IWOU.
- An EE/CA will be prepared and removal actions will be conducted at selected sites, including the sumps (Area 35).
- Long-term Groundwater Monitoring.
- ROD.
- RD.
- RA(C).

**2005 IAP**

**ER,A Active Sites**  
**(included in the PBC Contract)**

## AREA 1 - BUILDING 83 WASTEWATER LAGOONS

### LCAAP-001

#### SITE DESCRIPTION

Neutralized wastewater from the production of Trinitroresorcinal (TNR) at Building 83 was discharged into lagoons. A total of five lagoons have operated intermittently in this area from 1941 through 1986. Four of the five lagoons were removed under an approved closure plan between 1986 and 1988. Soil sampling performed as part of the closure activities indicated that all of the soil remaining in the lagoon areas after closure passed EP Toxicity criteria for lead (the indicator parameter).

#### PROPOSED PLAN

Prepare Work Plan, complete additional site characterization, and prepare RI/FS and Risk Assessment to determine appropriate remedy.

For management and funding purposes, this site has been consolidated into the PBC (GFPR) under LCAAP-036.

\*For administrative purposes, this site was declared RC in AEDB-R in September 2000.

#### STATUS

**RRSE RATING:** High

**CONTAMINANTS:** Metals

**MEDIA OF CONCERN:**

Groundwater

**COMPLETED IRP PHASE:**

PA/SI

**CURRENT IRP PHASE:** RI/FS,  
(RC\*)

**FUTURE IRP PHASE:** RD, RA,  
(RC\*)

## AREA 2 - BUILDING 85 WASTEWATER LAGOONS

### LCAAP-002

#### SITE DESCRIPTION

This site covers an area of ~two acres. Neutralized wastewater from the production of lead-based initiating compounds (tetrazene, lead styphnate) at Building 85 was discharged into two large lagoons and one small lagoon. The lagoons operated intermittently in this area from about 1960 through 1988. The two large lagoons were removed in 1990 as part of an MDNR approved RCRA Closure. Soil sampling performed as part of the closure activities indicated that all of the soil remaining in the lagoon areas after closure passed EP Toxicity criteria for lead (the indicator parameter), and had acceptable levels of total lead, strontium, and aluminum. The original small lagoon (which was not removed) continues to contain metals at levels above background values, as well as a trace of VOCs.

#### PROPOSED PLAN

Prepare Work Plan, complete additional site characterization, and prepare RI/FS and Risk Assessment to determine appropriate remedy.

For management and funding purposes, this site has been consolidated into the PBC (GFPR) under LCAAP-036.

\*For administrative purposes, this site was declared RC in AEDB-R in September 2000.

#### STATUS

**RRSE RATING:** High

**CONTAMINANTS:** Metals,  
Explosives

**MEDIA OF CONCERN:** Soil,  
Groundwater, Surface Water

**COMPLETED IRP PHASE:**

PA/SI

**CURRENT IRP PHASE:** RI/FS,  
(RC\*)

**FUTURE IRP PHASE:** RD, RA,  
(RC\*)

#### SITE DESCRIPTION

A series of sand quarry pits (the sand was used as building foundation material) and small lagoons were used for disposal of Plant construction materials and demolition/remodeling debris, Industrial Wastewater Treatment Plant (IWTP) sludge, and some off-site material (from DOE's Kansas City Plant). The area was used for disposal activities from about 1950 into the early 1970s.

Soil sampling in the area has shown elevated values of polycyclic aromatic hydrocarbons (PAH), metals above background values, and the presence of explosives. SCAPS sampling in 1999 indicated no VOCs in groundwater above detection limits.

#### PROPOSED PLAN

Prepare Work Plan, complete additional site characterization, and prepare RI/FS and Risk Assessment to determine appropriate remedy.

For management and funding purposes, this site has been consolidated into the PBC (GFPR) under LCAAP-036.

\*For administrative purposes, this site was declared RC in AEDB-R in September 2000.

#### STATUS

**RRSE RATING:** High

**CONTAMINANTS:** Explosives, PAHs, Metals

**MEDIA OF CONCERN:** Soil, Groundwater, Surface Water

**COMPLETED IRP PHASE:** PA/SI

**CURRENT IRP PHASE:** RI/FS, (RC\*)

**FUTURE IRP PHASE:** RD, RA, (RC\*)

# AREA 4 - BUILDING 139 - BACKLINE PONDS

## LCAAP-004

### SITE DESCRIPTION

A series of small lagoons were used for disposal of wastewater from the neutralization of lead styphnate slurry, lead azide, primer mix, and RDX. The area was used for these disposal activities from 1941 until 1985. Two small lagoons also accepted chemical laboratory wastes consistent with the products being manufactured during the same time period. The wastewater lagoons were removed under an approved closure plan during the period 1985 to 1987. Soil sampling indicated that remaining soil met background criteria for lead, the indicator parameter. Soil sampling in the remaining lagoons indicated the presence of metals above screening levels. Explosives compounds have also been detected in groundwater at low levels.

### PROPOSED PLAN

Prepare Work Plan, complete additional site characterization, and prepare RI/FS and Risk Assessment to determine appropriate remedy.

For management and funding purposes, this site has been consolidated into the PBC (GFPR) under LCAAP-036.

\*For administrative purposes, this site was declared RC in AEDB-R in September 2000.

STATUS

**RRSE RATING:** High

**CONTAMINANTS:** Explosives, Metals

**MEDIA OF CONCERN:** Soil, Groundwater, Surface Water

**COMPLETED IRP PHASE:** PA/SI

**CURRENT IRP PHASE:** RI/FS, (RC\*)

**FUTURE IRP PHASE:** RD, RA, (RC\*)

## AREA 5 - BUILDING 139 IMPOUNDMENTS

### LCAAP-005

#### SITE DESCRIPTION

Neutralized wastewater from the production and use of explosive compounds (TNR, RDX, PETN) at Building 139 was discharged into a lagoon. There were also solvent-cleaning and disposal activities in the area during the 1950s. The lagoon operated intermittently in this area from about 1941 through 1988. It was removed in 1990. Soil sampling performed as part of the closure activities indicated that all of the soil remaining in the lagoon areas after closure passed EP Toxicity criteria for lead (the indicator parameter). Continuing groundwater sampling, however, indicates the presence of explosives, VOCs, and metals.

#### PROPOSED PLAN

Prepare Work Plan, complete additional site characterization, and prepare RI/FS and Risk Assessment to determine appropriate remedy.

For management and funding purposes, this site has been consolidated into the PBC (GFPR) under LCAAP-036.

\*For administrative purposes, this site was declared RC in AEDB-R in September 2000.

#### STATUS

**RRSE RATING:** Medium

**CONTAMINANTS:** Metals, VOCs, Explosives

**MEDIA OF CONCERN:** Soil, Groundwater, Surface Water

**COMPLETED IRP PHASE:** PA/SI

**CURRENT IRP PHASE:** RI/FS, (RC\*)

**FUTURE IRP PHASE:** RD, RA, (RC\*)

## AREA 6 - BUILDING 65 IMPOUNDMENT

### LCAAP-006

#### SITE DESCRIPTION

One lagoon was used for disposal of wastewater from the load/assemble/pack activities for 20MM ammunition. The area was used for these disposal activities from 1941 until the late 1970s. Contaminants included metals and explosives. The lagoon was removed under an approved MDNR closure in 1990. The indicator parameter for closure was Chemical Oxygen Demand less than or equal to 10 times background. There are also 2 small areas where pipe leaks have been reported in the past.

#### PROPOSED PLAN

Prepare Work Plan, complete additional site characterization, and prepare RI/FS and Risk Assessment to determine appropriate remedy.

For management and funding purposes, this site has been consolidated into the PBC (GFPR) under LCAAP-036.

\*For administrative purposes, this site was declared RC in AEDB-R in September 2000.

#### STATUS

**RRSE RATING:** Medium

**CONTAMINANTS:** Explosives, Metals

**MEDIA OF CONCERN:** Soil, Groundwater, Surface Water

**COMPLETED IRP PHASE:** PA/SI

**CURRENT IRP PHASE:** RI/FS, (RC\*)

**FUTURE IRP PHASE:** RD, RA, (RC\*)

# AREA 7 - IND. WASTEWATER LAGOON AREA

## LCAAP-007

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### SITE DESCRIPTION

Area 7 is located in the center of the installation, to the north of Ditch A. Nine unlined lagoons were used as settling basins for “finished” wastewater from the IWTP. The northern-most set of three lagoons became inactive and was covered in 1952 but were never remediated. The two remaining sets of three lagoons were RCRA-closed in 1989. Historical activities and processes that have been documented in Area 7 have been the operation of an industrial wastewater treatment plant (IWTP) associated with a waste oil & grease operation and wastewater finishing lagoons. Sludge generated was designated as K046 hazardous waste. Other historical activities have been the collection and burning of waste solvents, operation of an explosives burning ground and an explosives container cleanup area.

One set of closed lagoons was retrofitted with double liners and a leachate collection system. It currently accepts finished wastewater from the IWTP. Three active sludge drying beds in the southeast portion of Area 7 receive nonhazardous sludge from drinking water treatment activities.

Historic soil sampling has indicated metals, SVOCs, and PCBs in exceedance of Industrial PRG values. Metals, VOCs, explosives, and radiological parameters have been detected in groundwater at Area 7. Metals have also been detected in surface water.

### STATUS

**RRSE RATING:** Medium

**CONTAMINANT:** Metals, Explosives, VOCs

**MEDIA OF CONCERN:** Soil, Groundwater, Surface Water

**COMPLETED IRP PHASE:** PA/SI

**CURRENT IRP PHASE:** RI/FS, (RC\*)

**FUTURE IRP PHASE:** RD, RA, (RC\*)

### PROPOSED PLAN

Prepare Work Plan, complete additional site characterization, and prepare RI/FS and Risk Assessment to determine appropriate remedy.

For management and funding purposes, this site has been consolidated into the PBC (GFPR) under LCAAP-036.

\*For administrative purposes, this site will be declared RC in AEDB-R in September 2004.

# AREA 8 - SOLID WASTE LANDFILL

## LCAAP-008

### SITE DESCRIPTION

Area 8 covers ~45 acres in the southwest corner of the installation. Four earth pits, two of which had engineered clay liners were used to dispose of sludge from the IWTP basins (Area 7). These four pits are part of ongoing RCRA/CERCLA/MDNR overlapping jurisdiction. Five earth pits north and west of the IWTP disposal area were used to dispose of IWTP-related material, and to dispose of construction debris created by USACE during construction of the 'Big Ditch'. Three of the four IWTP sludge disposal pits (which are operated under a Landfill Permit from MDNR) are currently covered. The fourth pit was constructed, but never used. The remaining five disposal pits are covered.

Six AOIs have been identified in Area 8, which consist of four Sludge Disposal areas, one oil & Grease Trench area, and a Permitted MDNR landfill. The permitted landfill is not eligible for ER,A funding. The remaining five Area 8 AOIs received various nonhazardous materials including sludge and oil & grease from the Industrial Wastewater Treatment Plant (IWTP) and construction debris from the construction of the 'Big Ditch.' The disposal areas were used sporadically from the 1950s until 1994. Excavation of the ditch took place in the mid-1980s and construction activities may have impacted one or more of the disposal cells in the area.

Both soil and groundwater samples collected at several of the disposal pits contained elevated levels of metals (primarily lead) and a trace of explosives.

### STATUS

**RRSE RATING:** High

**CONTAMINANT:** Metals

**MEDIA OF CONCERN:** Soil, Groundwater, Surface Water, Sediment

**COMPLETED IRP PHASE:** PA/SI

**CURRENT IRP PHASE:** RI/FS, (RC\*)

**FUTURE IRP PHASE:** RD, RA, (RC\*)

### PROPOSED PLAN

Prepare Work Plan, complete additional site characterization, and prepare RI/FS and Risk Assessment to determine appropriate remedy.

For management and funding purposes, this site has been consolidated into the PBC (GFPR) under LCAAP-036.

\*For administrative purposes, this site was declared RC in AEDB-R in September 2003.



## AREA 9 - BUILDING 60 TREATMENT FACILITY

### LCAAP-009

#### SITE DESCRIPTION

This area contains five in-ground tanks for treatment of mercurous nitrate generated from crack testing of small arms cartridges. It also contains a sludge drying bed for zinc cyanide sludge generated from chromium plating of steel cartridge cases. These units operated during the 1950s and 1960s.

This area was the subject of an RI/FS in 1990 as a separate Operable Unit. Based on the presence of metals and VOCs in the surface soils and explosives in groundwater, this site was incorporated into the IWOU and will require further characterization.

#### PROPOSED PLAN

Prepare Work Plan, complete additional site characterization, and prepare RI/FS and Risk Assessment to determine appropriate remedy.

For management and funding purposes, this site has been consolidated into the PBC (GFPR) under LCAAP-036.

\*For administrative purposes, this site was declared RC in AEDB-R in September 2000.

#### STATUS

**RRSE RATING:** Medium

**CONTAMINANTS:** Explosives, Metals, VOCs

**MEDIA OF CONCERN:** Soil, Groundwater, Surface Water

**COMPLETED IRP PHASE:** PA/SI

**CURRENT IRP PHASE:** RI/FS, (RC\*)

**FUTURE IRP PHASE:** RD, RA, (RC\*)

## AREA 11 - BURNING GROUND

### LCAAP-011

#### SITE DESCRIPTION

The burning grounds site (Area 11) is a RCRA-Closed facility formerly used for the open burning of propellants and waste pyrotechnics mixtures. Area 11 groundwater has been deferred to the CERCLA Program. Low levels of explosives and perchlorates have been detected in the groundwater. It is covered under the NECOU.

#### PROPOSED PLAN

Prepare Work Plan, complete additional site characterization, and prepare RI Addendum, FS and Risk Assessment to determine appropriate remedy.

For management and funding purposes, this site has been consolidated into the PBC (GFPR) under LCAAP-036.

\*For administrative purposes, this site was declared RC in AEDB-R in September 2000.

#### STATUS

**RRSE RATING:** Low

**CONTAMINANTS:** Explosives, Perchlorates

**MEDIA OF CONCERN:** Groundwater

**COMPLETED IRP PHASE:** PA/SI

**CURRENT IRP PHASE:** RI/FS, (RC\*)

**FUTURE IRP PHASE:** RD, RA, (RC\*)

# AREA 12 - LABORATORY WASTE LAGOON

## LCAAP-012

### SITE DESCRIPTION

Two lagoons were used during the late 1950s through the mid 1960s to dispose of liquid wastes from LCAAP's chemical and metallurgical laboratories located at Building 6. Chemical analyses from groundwater monitoring wells in Area 3 thought to be associated with the laboratory waste lagoons were responsible for LCAAP's being placed on the National Priorities List. LCAAP's paint shop is located in the eastern part of this area of investigation, and a small flyash disposal pit is located to the west.

Chemical Analyses from Water Supply Well 17AA report consistent detections of VOCs. Additional groundwater monitoring and SCAPS data (on 250 foot centers) also show detections of VOCs.

### PROPOSED PLAN

Prepare Work Plan, complete additional site characterization, and prepare RI/FS and Risk Assessment to determine appropriate remedy.

For management and funding purposes, this site has been consolidated into the PBC (GFPR) under LCAAP-036.

\*For administrative purposes, this site was declared RC in AEDB-R in September 2000.

### STATUS

**RRSE RATING:** Medium

**CONTAMINANTS:** Metals, Explosives, VOCs

**MEDIA OF CONCERN:** Soil, Groundwater

**COMPLETED IRP PHASE:** PA/SI

**CURRENT IRP PHASE:** RI/FS, (RC\*)

**FUTURE IRP PHASE:** RD, RA, (RC\*)

# AREA 13 - BUILDING #35 DRAINAGE AREA

## LCAAP-013

### SITE DESCRIPTION

This area accepted washwater and wastewater containing sodium dichromate from metal parts manufacturing in Building 35. The water emptied into a drainage ditch. Also in the area are a small solvents disposal pit and a drum handling and storage area. A variety of metals and explosives have been detected in the area above screening levels in the soil. The area of highest concentration for both metals and explosives is at the head of the drainage ditch.

### PROPOSED PLAN

Prepare Work Plan, complete additional site characterization, and prepare RI/FS and Risk Assessment to determine appropriate remedy.

For management and funding purposes, this site has been consolidated into the PBC (GFPR) under LCAAP-036.

\*For administrative purposes, this site was declared RC in AEDB-R in September 2000.

### STATUS

**RRSE RATING:** High

**CONTAMINANTS:** Metals, VOCs, Explosives

**MEDIA OF CONCERN:** Soil, Groundwater, Sediments

**COMPLETED IRP PHASE:** PA/SI

**CURRENT IRP PHASE:** RI/FS, (RC\*)

**FUTURE IRP PHASE:** RD, RA, (RC\*)

## AREA 14 - TANK FARM

### LCAAP-014

#### SITE DESCRIPTION

This area contains a burning ground that was used to dispose of wooden ammunition boxes. The area also contains an IWTP Sludge disposal area. Evidence exists to suggest the further characterization may be required to verify the nature and extent of metals in the soil and groundwater. The burning ground operated from 1951 through 1967. The sludge disposal area ceased operation in 1965.

#### PROPOSED PLAN

Prepare Work Plan, complete additional site characterization, and prepare RI/FS and Risk Assessment to determine appropriate remedy.

For management and funding purposes, this site has been consolidated into the PBC (GFPR) under LCAAP-036.

\*For administrative purposes, this site was declared RC in AEDB-R in September 2000.

#### STATUS

**RRSE RATING:** Medium

**CONTAMINANTS:** Metals

**MEDIA OF CONCERN:** Soil,  
Groundwater

**COMPLETED IRP PHASE:**  
PA/SI

**CURRENT IRP PHASE:** RI/FS,  
(RC\*)

**FUTURE IRP PHASE:** RD, RA,  
(RC\*)

## AREA 15 - TEMPORARY SURFACE IMPOUNDMENT

### LCAAP-015

#### SITE DESCRIPTION

This area contains a temporary surface impoundment built to temporarily contain wastewater from Buildings 35, 90C and 90D during lift station repairs. The wastewater contained Listed K046 waste. Metals, particularly lead and antimony, have been detected at elevated levels in sludge.

#### PROPOSED PLAN

Prepare Work Plan, complete additional site characterization, and prepare RI/FS and Risk Assessment to determine appropriate remedy.

For management and funding purposes, this site has been consolidated into the PBC (GFPR) under LCAAP-036.

\*For administrative purposes, this site was declared RC in AEDB-R in September 2000.

#### STATUS

**RRSE RATING:** Medium

**CONTAMINANTS:** Metals

**MEDIA OF CONCERN:** Soil

**COMPLETED IRP PHASE:**  
PA/SI

**CURRENT IRP PHASE:** RI/FS,  
(RC\*)

**FUTURE IRP PHASE:** RD, RA,  
(RC\*)

# AREA 17 - SANITARY LANDFILL & SOLVENT PITS

## LCAAP-017

### SITE DESCRIPTION

This area contains the following Solid Waste Management Units that are potential source areas for the contamination found in the NECOU:

1. **Area 17A** - A permitted Sanitary Landfill, that operated from 1980 to 1996.
2. **Area 17B** - Three Oil & Solvents Pits that received IWTP oil and grease, waste solvents, and waste oil from 1960 until 1979. Subsequently, a soil cover has been constructed above these pits.

The “East Gate Plume” area is the top priority in the NECOU. This area is in close proximity to the Installation boundary and off-Post residents. The source of contamination in the East Gate Plume has been traced back to the Oil and Solvents Pits.

3. **Area 17C** - An area where Waste Glass, Paint, and Solvents were buried in shallow pits and a stream bed. This area was active from 1960 through 1970.
4. **Area 17D** - An open burning pad which operated for a short time during 1975.
5. **Area 17E** - A pistol range, that is currently used by the LCAAP security force. It has been in use since 1979.

The Oil and Solvent Pits and the Waste Glass Paint and Solvent Pits are two of the most VOC-contaminated sites on Plant. Investigations (part of an expanded FS activity) are ongoing to further delineate areas of VOC, metals, and explosives contamination so those areas can be properly screened during the preparation of the FS.

In accordance with the Interim Action ROD signed in September 1998 a Permeable Reactive Barrier (PRB) was installed in July 2000 to prevent the flux of VOC contaminants from entering the Lake City Aquifer. The PRB is not performing as intended. Evaluation of the PRB and the surrounding area will determine possible augmentations, if any, that may be performed to meet remedial action objectives. Performance of the PRB will be considered in the remedy selection process.

### PROPOSED PLAN

Complete the RI Addendum and FS investigation, including plume delineation, the enhanced bioremediation pilot study, further metals contaminated soil delineation, and determination of aquifer hydraulic characteristics necessary to complete the remedial design. A RI Addendum, including an updated Risk Assessment, and a FS will be prepared following the investigation and pilot studies to determine appropriate remedy.

For management and funding purposes, this site has been consolidated into the PBC (GFPR) under LCAAP-036.

\*For administrative purposes, this site was declared RC in AEDB-R in September 2003.

### STATUS

**RRSE RATING:** High

**CONTAMINANT:** Explosives, Solvents, Metals

**MEDIA OF CONCERN:** Soil, Ground-water, Surface Water

**COMPLETED IRP PHASE:** PA/SI, 2 IRAS

**CURRENT IRP PHASE:** RI/FS (RC\*)

**FUTURE IRP PHASE:** RD, RA, (RC\*)

## AREA 19 - BUILDING 1 VICINITY

### LCAAP-019

#### SITE DESCRIPTION

This area comprises the “grounds” around and adjacent to Building 1. Several sumps are located around Building 1. A transformer pad at Building 5 and a former pole yard at Building 12A are also potential contaminant locations. A small underground storage tank is present at Building 1. It accepted mercurous nitrate wastes from a Mercury Crack Laboratory (mercury was used to artificially “age” cases to check for stress cracking).

#### PROPOSED PLAN

Prepare Work Plan, complete additional site characterization, and prepare RI/FS and Risk Assessment to determine appropriate remedy.

For management and funding purposes, this site has been consolidated into the PBC (GFPR) under LCAAP-036.

\*For administrative purposes, this site was declared RC in AEDB-R in September 2000.

#### STATUS

**RRSE RATING:** Low

**CONTAMINANTS:** Metals, VOCs

**MEDIA OF CONCERN:** Soil,  
Groundwater

**COMPLETED IRP PHASE:**  
PA/SI

**CURRENT IRP PHASE:** RI/FS,  
(RC\*)

**FUTURE IRP PHASE:** RD, RA,  
(RC\*)

## AREA 20 - BUILDING 2 VICINITY

### LCAAP-020

#### SITE DESCRIPTION

This area comprises the “grounds” around and adjacent to Building 2. Solvents were reported spilled in an area south of Building 14 (garage). The date of the spill and the quantity of material spilled is unknown.

Soil sampling in the area indicated no traces of VOCs, but arsenic and mercury were detected above background values.

#### PROPOSED PLAN

Prepare Work Plan, complete additional site characterization, and prepare RI/FS and Risk Assessment to determine appropriate remedy.

For management and funding purposes, this site has been consolidated into the PBC (GFPR) under LCAAP-036.

\*For administrative purposes, this site was declared RC in AEDB-R in September 2000.

#### STATUS

**RRSE RATING:** Medium

**CONTAMINANTS:** Metals, VOCs

**MEDIA OF CONCERN:** Soil,  
Groundwater, Surface Water

**COMPLETED IRP PHASE:**  
PA/SI

**CURRENT IRP PHASE:** RI/FS,  
(RC\*)

**FUTURE IRP PHASE:** RD, RA,  
(RC\*)

# AREA 21 - BUILDING 3 VICINITY

## LCAAP-021

### SITE DESCRIPTION

This area comprises the “grounds” around and adjacent to Building 3. This area also includes Buildings 3A and 12A, which were used during the 1960s for the machining and assembly of Depleted Uranium-containing .50 caliber and 20mm ammunition. Buildings 3A and 12A were “decontaminated” during 1985 and 1986. Subsequent inspection by Nuclear Regulatory Agency indicated that additional cleanup activities were required for Building 3A.

In July of 2001, the Army conducted a removal action to demolish and dispose of contaminated debris from Building 3A. In addition, three sumps were removed and disposed at a permitted disposal facility. Chemical and radiological confirmation samples were collected to verify that remaining soils do not exceed regulated levels of contaminants prior to backfilling of excavation areas.

### STATUS

**RRSE RATING:** Low  
**CONTAMINANTS:** Radioactive  
**MEDIA OF CONCERN:** Soil, Groundwater, Surface Water  
**COMPLETED IRP PHASE:** PA/SI  
**CURRENT IRP PHASE:** RI/FS, (RC\*)  
**FUTURE IRP PHASE:** RD, RA, (RC\*)

### PROPOSED PLAN

Prepare Work Plan, complete additional site characterization, and prepare RI/FS and Risk Assessment to determine appropriate remedy.

For management and funding purposes, this site has been consolidated into the PBC (GFPR) under LCAAP-036.

\*For administrative purposes, this site was declared RC in AEDB-R in September 2000.

# AREA 22 - DEMOLITION WASTE DUMP

## LCAAP-022

### SITE DESCRIPTION

This area contains a “demolition waste dump” which is thought to have been active during the 1940s and, perhaps, the early 1950s. The exact operating dates and the characteristics of the wastes the dump received are unknown.

### PROPOSED PLAN

Prepare Work Plan, complete additional site characterization, and prepare RI/FS and Risk Assessment to determine appropriate remedy.

For management and funding purposes, this site has been consolidated into the PBC (GFPR) under LCAAP-036.

\*For administrative purposes, this site was declared RC in AEDB-R in September 2000.

### STATUS

**RRSE RATING:** Medium

**CONTAMINANTS:** Metals, VOCs

**MEDIA OF CONCERN:** Soil, Groundwater, Surface Water

**COMPLETED IRP PHASE:** PA/SI

**CURRENT IRP PHASE:** RI/FS, (RC\*)

**FUTURE IRP PHASE:** RD, RA, (RC\*)



## AREA 23 - SLUDGE BURIAL PITS

### LCAAP-023

#### SITE DESCRIPTION

This area contains four IWTP sludge burial pits. The pits were operated during the mid 1960s, and ceased operation in 1967.

Sampling indicates trace levels of VOCs and metals, particularly zinc and copper.

#### PROPOSED PLAN

Prepare Work Plan, complete additional site characterization, and prepare RI/FS and Risk Assessment to determine appropriate remedy.

For management and funding purposes, this site has been consolidated into the PBC (GFPR) under LCAAP-036.

\*For administrative purposes, this site was declared RC in AEDB-R in September 2000.

#### STATUS

**RRSE RATING:** Medium

**CONTAMINANTS:** Metals, VOCs

**MEDIA OF CONCERN:** Soil,  
Groundwater, Surface Water

**COMPLETED IRP PHASE:**  
PA/SI

**CURRENT IRP PHASE:** RI/FS,  
(RC\*)

**FUTURE IRP PHASE:** RD, RA,  
(RC\*)

## AREA 24 - SANITARY WASTEWATER TRTMNT PLANT

### LCAAP-024

#### SITE DESCRIPTION

This area is the site of the now-inactive Sanitary Wastewater Treatment Plant. The Plant operated from 1941 until the industrial wastewater and sanitary wastewater streams were combined to go to Little Blue Valley Sewer District in 1990.

No sampling has been performed in this area. The Sanitary Wastewater Treatment Plant did not treat any industrial wastes.

#### PROPOSED PLAN

Prepare Work Plan, complete additional site characterization, and prepare RI/FS and Risk Assessment to determine appropriate remedy.

For management and funding purposes, this site has been consolidated into the PBC (GFPR) under LCAAP-036.

\*For administrative purposes, this site was declared RC in AEDB-R in September 2000.

#### STATUS

**RRSE RATING:** Low

**CONTAMINANTS:** Metals, VOCs

**MEDIA OF CONCERN:** Soil,  
Groundwater, Surface Water

**COMPLETED IRP PHASE:**  
PA/SI

**CURRENT IRP PHASE:** RI/FS,  
(RC\*)

**FUTURE IRP PHASE:** RD, RA,  
(RC\*)

## AREA 25 - DEMOLITION WASTE DUMP

### LCAAP-025

#### SITE DESCRIPTION

This area contains a disposal area which received “transite” asbestos wastes from Plant construction activities. The transite material is spread out on the ground and was put into a ditch at the dump location. The date when the material was disposed is unknown.

No sampling was performed in this area.

#### PROPOSED PLAN

Conduct a removal action for the debris disposal area. An EE/CA will be prepared in support of the removal action.

Site Closure will be documented in the IWOU ROD.

For management and funding purposes, this site has been consolidated into the PBC (GFPR) under LCAAP-036.

\*For administrative purposes, this site was declared RC in AEDB-R in September 2000.

#### STATUS

**RRSE RATING:** Low

**CONTAMINANTS:** Asbestos

**MEDIA OF CONCERN:** Surface Water, Sediment

**COMPLETED IRP PHASE:** PA/SI

**CURRENT IRP PHASE:** RI/FS, IRA, (RC\*)

**FUTURE IRP PHASE:** RD, RA, (RC\*)

## AREA 26 - DEMOLITION DUMP

### LCAAP-026

#### SITE DESCRIPTION

This area contains a disposal area which received roofing material from Plant construction activities. The material is spread out on the ground and was put into a ditch at the dump location. The date when the material was disposed is unknown.

Soil samples from the area indicated the presence of Poly Aromatic Hydrocarbons (PAH) (from roofing tar) and metals at elevated levels.

#### PROPOSED PLAN

Conduct a removal action for the debris disposal area. An EE/CA will be prepared in support of the removal action.

Site Closure will be documented in the IWOU ROD.

For management and funding purposes, this site has been consolidated into the PBC (GFPR) under LCAAP-036.

\*For administrative purposes, this site was declared RC in AEDB-R in September 2000.

#### STATUS

**RRSE RATING:** Low

**CONTAMINANTS:** PAHs, Metals

**MEDIA OF CONCERN:** Soil, Groundwater, Surface Water, Sediment

**COMPLETED IRP PHASE:** PA/SI

**CURRENT IRP PHASE:** RI/FS, IRA, (RC\*)

**FUTURE IRP PHASE:** RD, RA, (RC\*)

# AREA 27 - FIRING RANGE

## LCAAP-027

### SITE DESCRIPTION

The firing range has been in operation since the early 1950s to test all of the types of ammunition produced at LCAAP for function and accuracy. In addition to the “main” 2,600-yard range, tracer bullets were tested until the 1950s at the “Tracer Range” south of Building 45. Depleted uranium-containing rounds were tested at the 600-yard bullet trap and at impact areas along the range from the late 1950s until 1978.

At Areas 27A and 27B, the Army has collected soil samples and performed radiological screening within these areas as part of the NRC decommissioning program to identify radioactive materials (depleted uranium) within the area. The Army conducted the removal of radiologically contaminated soils from the 600-yard bullet catcher in 2001 (Area 10 Sand Pile). This removal action was conducted under the decommissioning requirements imposed by NRC.

The Army Field Support Command conducted a Risk Evaluation of the Area 27 A and B impact areas. No RI/FS activities will be completed until the closure of the range.

**STATUS**

**RRSE RATING:** Low

**CONTAMINANTS:** Metals, Radioactive Waste

**MEDIA OF CONCERN:** Soil, Groundwater, Surface Water

**COMPLETED IRP PHASE:** PA/SI, RI

**CURRENT IRP PHASE:** RC

**FUTURE IRP PHASE:** RC

**RC DATE:** 198901

# AREA 28 - PIPELINE LEAKS

## LCAAP-028

### SITE DESCRIPTION

This area comprises an ARCO pipeline leak that was reported to have occurred during the 1950s. There is no current or past evidence of the leak’s location.

### PROPOSED PLAN

Prepare Work Plan, complete additional site characterization, and prepare RI/FS and Risk Assessment to determine appropriate remedy.

For management and funding purposes, this site has been consolidated into the PBC (GFPR) under LCAAP-036.

\*For administrative purposes, this site was declared RC in AEDB-R in September 2000.

**STATUS**

**RRSE RATING:** NE

**CONTAMINANTS:** Petroleum Hydrocarbons

**MEDIA OF CONCERN:** Soil, Groundwater, Surface Water

**COMPLETED IRP PHASE:** PA/SI

**CURRENT IRP PHASE:** RI/FS, (RC\*)

**FUTURE IRP PHASE:** RD, RA, (RC\*)

## AREA 29 - WESTERN BORDER DUMPS

### LCAAP-029

#### SITE DESCRIPTION

This area contains two dumps situated along the western boundary of the Plant. The northern dump reportedly received debris from the original Plant construction activities. The southern dump was used during construction of the Big Ditch (from 1984 through 1987).

Soil borings indicated traces of VOCs and slightly elevated metals values above background in the southern pit area. Continuing groundwater monitoring has not shown any values above detection limits.

#### PROPOSED PLAN

Prepare Work Plan, complete additional site characterization, and prepare RI/FS and Risk Assessment to determine appropriate remedy.

For management and funding purposes, this site has been consolidated into the PBC (GFPR) under LCAAP-036.

\*For administrative purposes, this site was declared RC in AEDB-R in September 2000.

#### STATUS

**RRSE RATING:** High

**CONTAMINANTS:** Metals, VOCs

**MEDIA OF CONCERN:** Soil, Groundwater, Surface Water

**COMPLETED IRP PHASE:** PA/SI

**CURRENT IRP PHASE:** RI/FS, (RC\*)

**FUTURE IRP PHASE:** RD, RA, (RC\*)

## AREA 30 - BURNING PITS ASH DISPOSAL

### LCAAP-030

#### SITE DESCRIPTION

This area was used to burn wooden ammunition boxes from 1951 to 1967. The area has also accepted broken glassware and debris from the Plant chemical laboratories.

A variety of VOCs, metals, and explosives have been detected in the area at concentrations above background levels. In particular, the concentration of metals is among the highest concentrations detected at the plant.

#### PROPOSED PLAN

Prepare Work Plan, complete additional site characterization, and prepare RI/FS and Risk Assessment to determine appropriate remedy.

For management and funding purposes, this site has been consolidated into the PBC (GFPR) under LCAAP-036.

\*For administrative purposes, this site was declared RC in AEDB-R in September 2000.

#### STATUS

**RRSE RATING:** High

**CONTAMINANTS:** Explosives, Metals, VOCs

**MEDIA OF CONCERN:** Surface Water, Soil, Groundwater

**COMPLETED IRP PHASE:** PA/SI

**CURRENT IRP PHASE:** RI/FS, (RC\*)

**FUTURE IRP PHASE:** RD, RA, (RC\*)

# AREA 31 - FIREBREAK LANDFILLS

## LCAAP-031

### SITE DESCRIPTION

This area contains two dumps. They are the remnants of dumping in shallow open pits across a broad U-shaped area. The waste is assorted household debris, empty drums, and empty ammunition boxes. There is also evidence of some burning in the area. The area was probably sporadically active during the 1940s through 1960s. Some material may also have been added after that time.

A variety of Poly Aromatic Hydrocarbons (PAH) (from roofing tar and shingles), metals, and explosives have been detected in the area at concentrations above background levels. Lead, antimony, and arsenic were detected at elevated levels.

### PROPOSED PLAN

Conduct a removal action for the debris disposal area. An EE/CA will be prepared in support of the removal action. Site Closure will be documented in the IWOU ROD.

For management and funding purposes, this site has been consolidated into the PBC (GFPR) under LCAAP-036.

\*For administrative purposes, this site was declared RC in AEDB-R in September 2000.

**STATUS**

**RRSE RATING:** High

**CONTAMINANTS:** Explosives, Metals, PAHs

**MEDIA OF CONCERN:** Soil, Groundwater, Surface Water

**COMPLETED IRP PHASE:** PA/SI

**CURRENT IRP PHASE:** RI/FS, IRA, (RC\*)

**FUTURE IRP PHASE:** RD, RA, (RC\*)

## AREA 32 - HOUSE BASEMENT

### LCAAP-032

#### SITE DESCRIPTION

Scattered throughout the wooded area of the Plant are the remnants of several houses that existed prior to 1940 when the Installation was founded. A survey of the area revealed five intact houses or house basements. One of the basements contained empty drums and a tarry residue. Another one had a domestic waste dump adjacent to the foundation.

The empty drums have been removed, and the tarry material has been sampled and tested. Soil sampling was also performed at the domestic waste dump. It indicated elevated values for lead and for one of the PAHs.

#### PROPOSED PLAN

Conduct a removal action for the debris disposal area. An EE/CA will be prepared in support of the removal action. Site Closure will be documented in the IWOU ROD.

For management and funding purposes, this site has been consolidated into the PBC (GFPR) under LCAAP-036.

\*For administrative purposes, this site was declared RC in AEDB-R in September 2000.

#### STATUS

**RRSE RATING:** Low

**CONTAMINANTS:** Metals, PAHs

**MEDIA OF CONCERN:**

Groundwater

**COMPLETED IRP PHASE:**

PA/SI

**CURRENT IRP PHASE:** RI/FS,  
IRA, (RC\*)

**FUTURE IRP PHASE:** RD, RA,  
(RC\*)

# AREA 33 - BLENDING PELLETIZING

## LCAAP-033

### SITE DESCRIPTION

This site is located in the center of the facility and contains a series of small buildings with blast-deflector berms. Some of these structures were used in powder pouring operations which were conducted to scale-down bulk quantities of propellant. Other buildings were used to support operations in the former Fuze Line Area through the pelletizing of RDX. The three sumps in this area received wash-down water during operations but are presently inactive. Drains leading to the sumps were cemented closed in the 1970s. Historic sampling of soils found one sample that exceeded PRG for PAH.

### PROPOSED PLAN

Prepare Work Plan, complete additional site characterization, and prepare EE/CA for removal of the sumps (Site 35). Perform Risk Assessment (IWOU).

\*For administrative purposes, this site was declared RC in AEDB-R in September 2000.

**STATUS**

**RRSE RATING:** Low

**CONTAMINANTS:** Metals

**MEDIA OF CONCERN:**  
Groundwater

**COMPLETED IRP PHASE:**  
PA/SI

**CURRENT IRP PHASE:** RI/FS,  
(RC\*)

**FUTURE IRP PHASE:** RD, RA,  
(RC\*)

### SITE DESCRIPTION

Plant-wide surface water not otherwise addressed is covered under this site.

**Ditch A** is the channelized remnant of West Fire Prairie Creek. It provides storm water/runoff drainage for the western half of the Plant. Prior to 1990, Ditch A was the outfall receiver for the Industrial Waste-water Treatment Plant and for the Sanitary Sewage Plant. Sumps are also located in Area 33.

**Ditch B** is the channelized remnant of East Fire Prairie Creek. It provides storm water/runoff drainage for the eastern half of the Plant. Ditch A was the receiver for runoff from the firing range, the Building 139 Fuze Manufacturing Area, and from several of the Plant's main production and warehouse buildings. It also runs through Area 18 and the Northeast Corner Operable Unit.

Previous surface water and sediment sampling have indicated sporadic detections of VOCs and explosives.

### STATUS

**RRSE RATING:** Low

**CONTAMINANTS:** Metals, Explosives

**MEDIA OF CONCERN:** Soil, Groundwater, Surface Water, Sediment

**COMPLETED IRP PHASE:** PA/SI

**CURRENT IRP PHASE:** RI/FS, (RC\*)

**FUTURE IRP PHASE:** RD, RA, (RC\*)

### PROPOSED PLAN

Prepare Work Plan, complete additional site characterization, and prepare RI/FS and Risk Assessment to determine appropriate remedy.

For management and funding purposes, this site has been consolidated into the PBC (GFPR) under LCAAP-036.

\*For administrative purposes, this site was declared RC in AEDB-R in September 2000.



## PBC AREA 36 - GFPR

### LCAAP-036

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#### **SITE DESCRIPTION**

This is an administrative AEDB-R Area created for financial management of the Performance Based Contract. The scope of work is remedies in place for all operable units by the end of FY07, five years of operation and monitoring and completion of a ROD five-year review.

**2005 IAP**

## **ER,A Active Sites**

**(not included in Performance-Based Contract)**

# AREA 10 - FIRING RANGE WASTE DUMP

## LCAAP-010

### SITE DESCRIPTION

This area, known generically as the Sand Pile, contains waste sand from the backstops at the outdoor firing range. Ammunition produced at the Plant (and additional quality control rounds) is fired into sand backstops. During the 1960s, depleted uranium rounds were demilitarized by firing them into a sand backstop. From the early 1950s through the late 1970s, sand and bullet material were periodically removed from the backstops and disposed of in Area 10. The debris from the depleted uranium demilitarization effort was included in the material disposed of in Area 10.

An EE/CA has been produced and is currently under revision.

Media other than the sand piles and subsurface soils impacted by radiological contamination, including GW and soils beyond sand piles, will be addressed in the IWOU ROD.

### PROPOSED PLAN

Remove the sand pile. This is a joint effort by LCAAP/ER,A and Army Field Support Command (Radiation Safety Office).

STATUS

**RRSE RATING:** Low

**CONTAMINANT:** Metals, Explosives, Depleted Uranium

**MEDIA OF CONCERN:** Soil, Groundwater, Surface Water

**COMPLETED IRP PHASE:** PA/SI, RI

**CURRENT IRP PHASE:** RI/FS (EE/CA - Funded)

**FUTURE IRP PHASE:** RA

# AREA 16 - ABANDONED LANDFILL

## LCAAP-016

### SITE DESCRIPTION

Area 16A is the only area being addressed with funds under this site. All other areas listed below are included in the GFPR contract.

LCAAP-016 contains the following Solid Waste Management Units:

**Area 16A** - An abandoned solid waste landfill which accepted Plant-generated industrial/construction waste from 1970 through 1979.

**Area 16B** - Several small trenches which received solvents during the 1950s.

**Area 16C** - A pistol range (closed), which the LCAAP security force used from 1952 through 1963.

**Area 16D** - An open burning ground which was operated from 1952 through 1957.

**RCRA (A)** - An area where five above-ground Waste Oil and Solvents tanks were operated from 1980 through 1982.

**RCRA (B)** - A drum storage area which operated from 1979 until 1982, the RCRA solvents trenches and the above-ground tanks staging areas are both collocated RCRA Sites that are being addressed as part of the CERCLA Program per the FFA.

The Action Memorandum for the Non-Time-Critical Removal Action for the Area 16A Abandoned Landfill was signed in June 2001. A Removal Action Management Plan was developed for the installation of a leachate collection system and cover at the Area 16A Abandoned Landfill in August 2001. An ESD was prepared and approved in FY04 which proposed the engineered wetlands for the treatment of leachate. Installation of soil cover and monitoring wells was completed in FY04.

Specific areas of concern funded under GFPR include LCAAP-011, The West Plume (Area 16B), Collocated RCRA Areas, NECOU-wide surface water monitoring and treatment, and NECOU-Wide groundwater monitoring.

### STATUS

**RRSE RATING:** High

**CONTAMINANT:** Explosives, Solvents, Metals, Perchlorates

**MEDIA OF CONCERN:** Soil, Groundwater, Surface Water

**COMPLETED IRP PHASE:** PA/SI

**CURRENT IRP PHASE:** RI/FS, IRA (ABLF Removal Action)

**FUTURE IRP PHASE:** RI/FS, IRA, RD, RA(C), RA(O) (list includes phases in the PBC Areas)

### PROPOSED PLAN

**ABLF (16A):** Completion of the engineering wetlands and post-construction monitoring.

*The areas below are all part of the PBC contract (LCAAP-036):*

**West Plume Area (Area 16B):** Source removal and offsite disposal, groundwater extraction and treatment, and installation of groundwater monitoring wells.

**Collocated RCRA Areas (A & B):** Source removal and LTM.

**NECOU-wide surface water:** Address seepage by engineered wetland including phreatophytes for groundwater control, LTM.

**NECOU-wide groundwater monitoring:**

Install new wells (partially funded in prior years).

# AREA 18 - BURNING PITS, LAGOONS & TRENCHES

## LCAAP-018

### SITE DESCRIPTION

This area contains the following Solid Waste Management Units being addressed under the PBC:

1. A central area of burn pits located along “Ditch B”. The pits were used to burn Plant construction debris and solvents. The pits were operated from 1952 through 1975.
2. Surrounding the central burn pit area are a number of smaller pits, trenches, and lagoons which accepted solvents, IWTP oil and grease, and other Plant-generated industrial wastes. These pits were used intermittently from 1952 through 1975. Several pits in this group contain extremely high levels of NAPL and PCBs. A strong natural attenuation process appears to be occurring, such that dissolved phase concentrations are significantly reduced within a short distance from the source areas. Two successful bench tests (enhanced bioremediation, chemical oxidation) significantly reduced residual concentrations further.
3. Metals/PCB-containing material has been spread in a thin layer over the ground in the area of the pits. This activity is believed to have been part of the pit capping operations taking place during 1975.

The following activity is non-PBC: A pump and treat system consisting of a former Water Supply Well (17FF), two Water Extraction Wells (17R and 17S), and a treatment system located in Building 163 were installed and officially began operation in April 1997. It is containing the groundwater plume. It was designed and constructed as a Removal Action; but, with the signing of the Area 18 ROD in April 1999, it has become part of the Final Remedy for the Area 18 Operable Unit.

The selected alternative in the ROD which includes Multi-Phase Vacuum Extraction System to remove source materials and removal of lead contaminated soils was designed but not implemented. Data collected in support of the MPVE system indicated that VOC contamination extended both vertically and areally further than anticipated. A field investigation is currently under way to characterize the nature and extent of the VOC contamination and evaluate remedial options.

Any additional COCs will be evaluated during the investigation.

### STATUS

**RRSE RATING:** High  
**CONTAMINANT:** Solvents, Metals, PCBs  
**MEDIA OF CONCERN:** Soil, Groundwater  
**COMPLETED IRP PHASE:** PA/SI, RI/FS  
**CURRENT IRP PHASE:** RI/FS (Addendum - funded), IRA, RD  
**FUTURE IRP PHASE:** RI/FS, IRA, RD, RA(C), RA(O) (list includes phases in the PBC Areas)

### PROPOSED PLAN

Complete the post-ROD investigation, including plume delineation, the enhanced bioremediation pilot study, further metals and PCB-contaminated soil delineation, and determination of aquifer hydraulic characteristics necessary to complete the remedial design. A RI/FS Addendum will be prepared following the investigation and pilot studies.

In FY05 an installation-wide five-year ROD review will be conducted by the Army and is funded under LCAAP-018.

### SITE DESCRIPTION

This site contains ~127 inactive sumps located within the plant. The Army believes that these sumps and their associated piping are potential source areas and are integral to the investigation of soil and groundwater media. All the sumps in LCAAP-013 and LCAAP-015 will be addressed under PBC. The remaining sumps are addressed under AEDB-R site LCAAP-035.

### PROPOSED PLAN

Although sampling of the contents of the inactive sumps has been completed and a draft EE/CA has been transmitted for removal of the sumps, further investigation is required to confirm the extent of environmental impacts to surrounding soil or groundwater. Based on the sampling, the sumps, their contents, and the associated piping will be abandoned, or removed and disposed appropriately via a removal action.

Site Closure will be documented in the IWOU ROD (PBC).

### STATUS

**RRSE RATING:** High

**CONTAMINANTS:** Metals, Explosives, VOCs, PCBs

**MEDIA OF CONCERN:** Soil, Groundwater, Surface Water

**COMPLETED IRP PHASE:** PA/SI, RI

**CURRENT IRP PHASE:** RI/FS

**FUTURE IRP PHASE:** IRA

## PAST MILESTONES

<b><u>IRP Phase</u></b>	<b><u>Completion Date</u></b>
Installation Assessment	May 1980
REM (Close 25 Lagoons)	1987-1990
Phase I RI/FS Fieldwork	Aug 1988
PA/SI	Jan 1989
Phase IIa RI Fieldwork	Sep 1990
Phase IIb RI Fieldwork	Dec 1992
Install 6 Air Strippers	1990-1992
Draft I-W RI	Oct 1993
Area 18 RI	March 1995
Area 18 FS	March 1996
NECOU RI	March 1996
Draft NECOU FS:	June 1996
Area 18 Proposed Plan	April 1997
Final NECOU Interim Action ROD	September 1998
Final Area 18 ROD	April 1999
Necou IRA draft ramp	December 1999
Area 18 Draft WP	May 2001
Area 16 Draft-Final IRA Report	July 2001
Area 18 Draft-Final Lead Spec.	August 2001
Area 16 Draft-Final Ramp	August 2001
Area 16 Final IRA Construction Summary Report	December 2002

## PROJECTED MILESTONES

<b><u>IRP Phase</u></b>	<b><u>Date</u></b>
NECOU RI Addendum/FS Report	April 2006
NECOU ROD	January 2007
NECOU Remedy-in-Place Report	January 2008
Area 18 RI/FS Addendum	December 2005
Area 18 ROD Amendment	October 2006
Area 18 Remedy-in-Place Report	October 2007
IWOU RI/FS Report	November 2005
IWOU ROD	September 2006
IWOU Remedy-in-Place Report	December 2007

## Lake City Army Ammunition Plant Installation Action Plan Schedule (Based on Cost-to-Complete current funding constraints)

### CURRENT PHASE

### FUTURE PHASE

AEDB-R #	Site Name	RRSE	Phase	FY05	FY06	FY07	FY08	FY09	FY10	FY11+
<b>LCAAP-010</b>	Area 10 - Firing Range Waste Dump	Low	IRA							
			RA(C)							
<b>LCAAP-016</b>	Area 16 - Abandoned Landfill	High	IRA							
			RA(C)							
<b>LCAAP-018</b>	Area 18 - Burning Pits, Lagoons & Trenches	High	IRA							
			RA(C)							
			RA(O)							
<b>LCAAP-035</b>	Area 35 - Sumps	High	IRA							
			RA(C)							
<b>LCAAP-036</b>	PBC Area 36 - GFPR	NE	RA(C)							
			RA(O)							



# Remediation Activities

## **COMPLETED REM/IRA/RA:**

- Total Sites Assessed: 35
- Air Strippers installed in 3 wells, January 1990, and 4 additional wells, 1992.
- REM LCAAP-002 Lagoons removed in 1990.
- Installation (all sites), LCAAP closed 25 lagoons and trenches by waste removal under RCRA (1986-89).
- Area 18 (LCAAP-018) pump and treat system constructed (1997).
- Comprehensive GMP began in 1988.
- Area 16 Groundwater Extraction Well EW-2 (1998).

## **CURRENT REM/IRA/RA:**

- Area 18 (LCAAP-018), Removal Action pump and treat system for contaminated groundwater has been in operation since March 1997.
- NECOU (LCAAP-016, 17), Removal Action to install a cover to meet MDNR requirements for three-foot soil cover over abandoned landfill to minimize potentially contaminated groundwater moving off the landfill.
- NECOU (LCAAP-016, 017) Optimization of permeable reactive barrier to treat groundwater as required by IROD. Construction to augment PRB anticipated summer 2007.

## **FUTURE REM/IRA/RA:**

- RA at LCAAP-010, 016, 017, 018
- IRA at LCAAP-016

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# Community Involvement

## RESTORATION ADVISORY BOARD (RAB) STATUS

A Technical Review Committee met quarterly from December 1987 until December 1996. In 1996, LCAAP held a public meeting to determine interest in forming a Restoration Advisory Board (RAB). The RAB first met in May 1997 and has met regularly every two months. Since January 1999, RAB meetings have been held quarterly.